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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,992	08/21/2001	Lowell Winger	CISCP253/4148	8280

22434 7590 09/21/2004

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EXAMINER	
SHERALI, ISHRAT I	

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/934,992	WINGER, LOWELL	
	Examiner	Art Unit	
	Sherali Ishrat	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on 21 August 2002 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 1-27 are rejected under 35 U.S.C § 101 because of non-statutory process. Independent claims 1, 5, 12 and 20, recite "creating an optimal codebook; comprising: initializing a base codebook B; creating codebook C; updating base codebook and determining if the content of codebook have converged". This process consist solely of mathematical operations without practical application in the technological arts such as image data compression or quantization. Claims 2-4, 6-11 and 13-19 are dependent on independent claims 1, 5, 12 and 20 therefore they are also rejected.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 24-27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

Regarding claim 24, claim in lines 2-3 recites "compression module providing to graphics engine non conventional 3D, 2D and 1D image data". Applicant in the specification, page 15, lines 6-9, discusses non-conventional texture data is communicated across processor/memory from compression module". However applicant in the specification has not shown what is non conventional 3D, 2D and 1D image data. Claims 25-27 are dependent on claim 24 therefore they are also rejected.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 12-16 and 19 are rejected under 35 USC § 102 (b) as being anticipated by Podilchuck (US 5,802,208).

Regarding claim 12, Podilchuck discloses creating an optimal codebook (Podilchuck states in col.5, lines 34-35, "replacing codebook with improved codebook" which corresponds to creating an optimal codebook);

initializing a base codebook B (Podilchuck states in col. 5, lines 40-42, "initializing the codebook to be used in the first iteration" which corresponds to initializing a base codebook);

creating a codebook C from base codebook B (Podilchuck states in col. 5, lines 61-65, "each training vector is assigned to the cluster associated with the code vector in

the current codebook to which it is closest as determined by the error function" and in col. 6, lines 1-4, "a new codebook is developed for use in the next iteration based on the cluster sets which resulted from analysis of 32 in figure 3" which corresponds to creating a codebook C from base codebook B); and

determining if the contents of base codebook B have converged (See Podilchuck states in col. 6, lines 25-32, "Dm comprise a measure of accuracy with which codebook Cm is able to code the given set of training vectors. Finally, decision 35 [Figure 3] computes the difference between the computed distortion and the distortion measure for previous iteration in order to measure the degree of improvement in the quality of the codebooks from the previous iteration if this difference is less than threshold the iteration is terminated" which corresponds to determining if the contents of base codebook B have converged).

Regarding claim 13, Podilchuck discloses randomly selecting source vectors from a block of data without replacement (Podilchuck states in col. 5, lines 41-45, "initializing the codebook to be use in the first iteration to a random set of code vectors. These randomly chosen codevectors may for example comprise the first M vectors from the training set" which corresponds to randomly selecting source vectors from a block of data without replacement).

Regarding claim 14, Podilchuck discloses if base codebook B is singular, invoking reinitialize base codebook B (Podilchuck states in col. 5, lines 41-45, "initializing the codebook to be use in the first iteration to a random set of code vectors. These randomly chosen codevectors may for example comprise the first M vectors from

the training set". Whenever in the system of Podilchuck base codebook is empty or singular the system will reinitialize with random set of code vectors and that iteration will be first iteration).

Regarding claim 15, Podilchuck discloses reinitialize comprising selecting an outlying code vectors from within a block of data (Podilchuck states in col. 5, lines 41-45, "initializing the codebook to be use in the first iteration to a random set of code vectors. These randomly chosen codevectors may for example comprise the first M vectors from the training set" which corresponds to Podilchuck discloses reinitialize comprising selecting an outlying code vectors from within a block of data) and

inserting outlying source code vectors in base codebook B (Podilchuck states in col. 5, lines 41-45, "initializing the codebook to be use in the first iteration to a random set of code vectors. These randomly chosen codevectors may for example comprise the first M vectors from the training set" which corresponds to inserting outlying source code vectors in base codebook B);

Regarding claim 16, Podilchuck discloses finding the nearest neighbour for each source vector in a block of data and associating each source vector with a base codevector in base codebook B (Podilchuck states in col. 5, lines 46-54, "in each iteration in step 32 in figure 3 uses entire set of training vectors to form cluster sets. In particular each training vector x is matched against each code vector in the codebook and computing an error" which corresponds to finding the nearest neighbour for each source vector in a block of data and associating each source vector with a base codevector in base codebook B).

Regarding claim 19, Podilchuck discloses determining if the contents of base codebook B have converged (Podilchuck states in col. 6, lines 17-20, "total distortion measure for the the given iteration is calculate based on the distance between each of the training vectors and the centroid to which it clusters [base code book]" which corresponds to determining if the contents of base codebook B have converged),

determine that the values contained in base codebook B have not converged , returning control of system to nearest neighbour (Podilchuck states "if the difference is less than a threshold then the improvement in code the iteration is terminated" i.e Podilchuck is stating that otherwise if difference is greater than threshold the iteration is repeated above procedure for cluster formation [nearest neighbour /cluster formation, col. 5, lines 46-54] will be repeated);

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 5-8, 11 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Podilchuck (US 5,802,208) in view of Tarolli et al. (US 5,822,452).

Regarding claim 5, Podilchuck discloses creating a optimal codebooks (Podilchuck states in col.5, lines 34-35, "replacing codebook with improved codebook" which corresponds to creating an optimal codebook);

a general purpose computer (Podilchuck, states in col. 4, lines 20-24, "in figure 1 processor extracts region of interest from the input image and normalizes the scale which corresponds to a general purpose computer[processor] and figure 2 shows process of compressing training images using block-based transform, generating codebook performed by computer/processor);

compression module (Podilchuck, states in col. 4, lines 29-34, "extracted portions of image are decomposed in to blocks and block based transform is performed [figure 1, block 22 and 25] codebook generator which corresponds to compression module); comprising:

calculating initial values for a base codebook B (Podilchuck states in col. 5, lines 41-45, "initializing the codebook to be use in the first iteration to a random set of code vectors. These randomly chosen codevectors may for example comprise the first M vectors from the training set" which corresponds to calculating initial values for a base codebook B [first M vectors from training set]),

initializing comprising source vectors from a block of data (Podilchuck states in col. 5, lines 41-45, "initializing the codebook to be use in the first iteration to a random set of code vectors. These randomly chosen codevectors may for example comprise the first M vectors from the training set" which corresponds to initializing comprising source vectors from a block of data),

nearest neighbour module accepting base codebook B as input from initialization module and assigning each source in data block to a vector in base codebook B (Podilchuck states in col. 5, lines 40-54, "figure 3 begins with step 31 which

initializes the code book to random set of vectors for example M vectors from the training set and then in each iteration in step 32 in figure 3 uses entire set of training vectors to form cluster sets. In particular each training vector x is matched against each code vector in the codebook and computing an error" which corresponds to nearest neighbour module accepting base codebook B as input from initialization module and assigning each source in data block to a vector in base codebook B), and

calculating a codebook C based upon values in base codebook B (Podilchuck states in col. 6, lines 1-5, "figure 3 step 33 a new code book is developed for use in the next iteration based on the clusters sets which resulted from analysis of step 32 [figure 3 base codebook] which corresponds to calculating a codebook C based upon values in base codebook B);

centeroid module recalculating the values contained in base codebook B to improve convergence (Podilchuck states in col. 6, lines 3-20, "In particular for each cluster set [figure 3, step 32 and 33] the centroid of the set i.e an n-dimensional weighted of the individual vectors in set is computed. Then the new codebook for the next iteration is constructed so as to comprise the set of computed centroids, note that mean square error is used as error metric in step 34 [figure 3] a total distortion measure for given iteration is calculated based on distance between each of the training vectors and the centroid to which clusters" which corresponds to centeroid module recalculating the values contained in base codebook B to improve convergence or minimize error) ;

convergence module determining if centroid module has converged the values in the base codebook B (Podilchuck states in col. 6, lines 18-21, "total distortion measure for the iteration is calculated based on distance between each of the training vectors and the centroid to which clusters" and col. 6, lines 25-35, "Dm comprise measure of accuracy with which codebook is able to code the given set of training vectors, finally decision computes the difference between the computed distortion and distortion in the previous iteration, if the difference is less than threshold iteration is terminated" which corresponds to convergence module determining if centroid module has converged the values in the base codebook B).

Podilchuck discloses computer and compression module (Podilchuck, figure 2, blocks 21, 22 and 25) as discussed above. Podilchuck however has not explicitly shown memory connected to computer and compression module resident in memory.

In the same field of endeavor Tarolli discloses memory connected to computer (Tarolli, figure 1, blocks 102, 122 and 106, Tarolli shows memory [block 122] connected to computer [block 102] through processor/memory bus [block 106]), and

compression module resident in memory (Tarolli, figure 1, compression module resident in memory [block 122]).

Therefore it would have been obvious to one having ordinary skill in the art at time the invention was made to connect memory to computer and reside compression module in memory in the system of Podilchuck because such a process provide software based compression process/module which can be implemented using general

purpose personnel computer (PC) and which can be easily transported to any other PC platform.

Regarding claim 6, Podilchuck discloses randomly selecting source vectors from a block of data without replacement (Podilchuck states in col. 5, lines 41-45, "initializing the codebook to be use in the first iteration to a random set of code vectors. These randomly chosen codevectors may for example comprise the first M vectors from the training set" which corresponds to randomly selecting source vectors from a block of data without replacement).

Regarding claim 7, Podilchuck discloses should base codebook B singular reinitializing codebook B (Podilchuck states in col. 5, lines 41-45, "initializing the codebook to be use in the first iteration to a random set of code vectors. These randomly chosen codevectors may for example comprise the first M vectors from the training set". Whenever in the system of Podilchuck base codebook is empty or singular the system will reinitialize with random set of code vectors and that iteration will be first iteration).

Regarding claim 8, Podilchuck discloses reinitializing comprise selecting an outlying source data from block of data (Podilchuck states in col. 5, lines 41-45, "initializing the codebook to be use in the first iteration to a random set of code vectors. These randomly chosen codevectors may for example comprise the first M vectors from the training set" which corresponds to Podilchuck discloses reinitialize comprising selecting an outlying code vectors from within a block of data).

Regarding claim 11, Podilchuck discloses convergence module returns control to nearest neighbour module should the values in base codebook B not be converged (Podilchuck states "if the difference is less than a threshold then the improvement in code the iteration is terminated" i.e Podilchuck is stating that otherwise if difference is greater than threshold the iteration is repeated above procedure for cluster formation [nearest neighbour /cluster formation, col. 5, lines 46-54] will be repeated).

Regarding claim 24, Tarolli discloses if graphics engine does not provide a conventional interface, compression module providing to graphics engine non conventional 3D, 2D, and ID image data (Tarolli states in col. 5, lines 42-45, frame buffer interface [FBI] is connected to texture mapping units [graphics engine] i.e Tarolli shows graphics engine [texture mapping units] provide convention interface which is FBI and col. 5, lines 52-55, FBI implements three dimensional primitives including Gouraud shading, depth buffering and dithering, this three-dimenensional primitives in the system of Tarolli is 3D image data which obviously include 2D and 1D image data).

Communication

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sherali Ishrat whose telephone number is 703-308-9589. The examiner can normally be reached on 8:00 AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ishrat Sherali

Patent Examiner

Group Art Unit 2621

September 14, 2004

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